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Abstract:
A wide range of sociological and psychological studies have shown that children have different cognitive and behavioural outcomes depending on whether they grow up in intact or non-intact families. These gaps may be attributable to differences in the amounts of time and money parents invest in their children, which can in turn result in differences in the amount of time children invest in educational activities. In this paper, we investigate whether children who live with a single parent devote more or less time to reading and studying at home than children who live with both parents. We use data from the Italian Time Use Survey, which contains a detailed time diary for all of the family members in each surveyed household above the age of three. Focusing on children between five and 18 years old, and controlling for the endogeneity of the family structure, our analysis shows that living in a single-parent household reduces the amount of time children devote to reading and studying. This effect turns out to be driven by single parents—mainly single mothers—who are poor and less educated. In addition, the negative effect of living with a single parent is driven by male children, and is greater for children without siblings.

Keywords: children investments, children outcomes, time-use, single-parent household

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1. Introduction

The Italian family is changing rapidly. Over a period of less than 20 years, starting in 1995, the absolute numbers of divorces increased by 90 per cent. Although the diffusion of divorce in Italy is still far more limited than it is in many other developed countries—especially in the Nordic and Anglo-Saxon countries—the Italian divorce rate is clearly rising. Whereas in 1995 a hypothetical cohort of 1,000 marriages experienced on average 80 divorces, this value had risen to 182 by 2011. Over the same period, the number of separations also increased, reaching 307 (ISTAT, 2012). As almost 70 per cent of these separations involved couples with children, concerns have been raised about the well-being and outcomes of these children. In this context, it is important to note that the diffusion of separation usually follows the well-known "S" shape (Goode, 1962). This means that the speed of diffusion is slow at first, then increases rapidly, and then slows down again when approaching its maximum. This trend suggests that the new behaviour first emerges in certain population strata, and then later spreads to other strata. In line with the predictions of this model, rates of separation in Italy have been higher among better educated couples in which the wife works, and who are therefore in a relatively good position to cope with the legal and socioeconomic costs of separation (Salvini and Vignoli, 2011). However, this pattern is changing, as divorce now appears to be spreading to Italian families in the lower socioeconomic classes (Salvini and Vignoli, 2011; Harkonen and Dronkers, 2006). It has been argued that any detrimental effects of this trend on children have likely so far been modest, as most of the parents who have separated have relatively high levels of human capital and reasonably strong safety nets in the form of family resources. However, the diffusion of divorce among less educated and lower income couples will likely increase the vulnerability of single-parent families, and as a result have negative consequences for children.

The effects on children when their parents separate depend in part on the background characteristics of the particular family, but also in part on the welfare system that was put in place to alleviate the socioeconomic challenges that can often arise in such cases, especially among single mothers. Given the "light-familistic" welfare state in Italy (Aassve et al., 2007; Aassve et al., 2009) the consequences of divorce are potentially more severe for Italian children than they are for children in other EU countries. Currently, Italy does not have the kind of institutional framework found elsewhere in Europe for coping with a high prevalence of single parenthood.

A wide range of sociological and psychological studies have shown that children from intact and not-intact families have different cognitive and behavioural outcomes. Children of divorced parents, and of single mothers in particular, tend to have worse outcomes in school (i.e., higher drop-out rates and lower cognitive test scores), in the labour market (i.e., lower earnings, lower employment status, and a greater degree of welfare dependency), and in behaviour (i.e., higher rates of teenage pregnancy and couple instability). These negative outcomes may be attributable in part to the lower amounts of time and money single parents invest in their children. However, analyses of more recent data using appropriate econometric techniques that accounted for potential endogeneity have shown that the effects on children's outcomes from adverse family structures are small or negligible (Aughinbaugh, 2005; Hofferth, 2006; Bjorklund and Sundstrom, 2006; Sanz-de-Galdeano and Vuri, 2007; Finlay and Neumark, 2008; Francesconi et al., 2010; Corack, 2011, Pronzato and Aassve, 2013).

Our study builds on these more recent findings, and looks at the relationship between family structure and the amount of time the children themselves devote to activities that build human capital, such as reading and studying. These activities are closely connected to later outcomes for children, including their earnings, their occupational status, and their degree of welfare dependency. The main hypothesis is that children of single parents receive lower investment from parents, these children may spend less time on activities associated with the accumulation of human capital. Thus, growing up in a single-parent family may have negative effects on the long-term outcomes of children. This issue may be more salient in the Italian setting than it is in other developed countries, not only because of the rather low levels of public support provided to disrupted families, but also because of the peculiarities of the Italian school system. In Italy, children spend relatively few hours at school, but do a large amount of homework. This model is based on the assumption that one of the parents is at home during the day. If the cognitive outcomes of children are related to the human capital they accumulate through regular interactions with their parents, the children of single parents may suffer more in Italy than in other countries. In other words, the fact that single parents in Italy have relatively little time to spend with their children could exacerbate the detrimental effects of divorce on Italian children.

In light of these considerations, we have chosen to investigate the question of whether the amount of time children devote to educational activities, such as reading and studying, is affected by whether they live with one or both parents. Our analysis considers children who live with either a single mother or a single father, although this second category represents only 1 per cent (59 observations) of our sample. Importantly, we take into account the

potential selection of family structure with respect to children's human capital accumulation. Single-parent families can be systematically different from standard families with respect to factors correlated with human capital investments in children. In other words, it may not be family disruption or living with a single parent *per se* that leads to lower levels of human capital accumulation among the children of divorced parents, but rather the characteristics of parents who divorce. We therefore correct for selection by using the approach suggested by Maddala (1983).

Contrary to the findings of most of the previous literature, our results for Italy show that the negative effect of living with a single parent remains, even after correcting for selection. We attribute this negative effect to the failure of the Italian educational and welfare systems to provide support to lone parents.

The paper is organised as follows. In Section 2, we provide a review of the relevant literature. We then present the empirical method used in our analysis in Section 3, and the data used in Section 4. In Section 5, we describe the sample selection and the definitions of the variables. In Section 6, we report and discuss the results of our estimates. Finally, we present our conclusions.

2. Background

There is now a large body of literature on the consequences of divorce and separation for adults and children, and the main focus of these studies has been the extent to which family disruption negatively affects the well-being of various family members (see Bernardi et al., 2013, for a review of the related literature). These studies have investigated the possible mechanisms that explain the observed negative association between parental break-up and children's educational attainment. The results of these studies have, for example, shown that union disruption can lead to a reduction in economic resources, changes in parenting practices, a reduction in the amount of time parents spend with their children, an increase in parental stress, and a decrease in the emotional well-being of children (Bernardi and Radl, 2014).

Across a range of measures, the literature has consistently shown that the well-being of the children of divorced parents is, on average, lower than the well-being of children who live in intact families (Amato, 2001; Amato and Keith, 1991). Hughes Miller et al. (1999), who studied almost 6,000 students in the eighth grade in the US, found that the children of divorced parents were more likely to engage in deviant behaviour. They argued that parental

involvement—i.e., the supervision of children and the passing on of positive attitudes towards work and school—is directly linked to family structure. Applying fixed-effects estimation to a 17-year panel, Amato and Sobolewski (2001) found that children who experienced parental divorce tended to report relatively low levels of psychological well-being in adulthood. For the UK, Ermisch and Francesconi (2001) found that children who had spent time with a single mother during childhood had lower levels of educational achievement and higher chances of experiencing economic inactivity. Similarly, in their analysis of the long-run effects of family break-up on the labour market outcomes of children, Robins et al. (2001) found that, on average, children who grew up in disrupted households—and especially girls—went on to have lower levels of education, lower wages, and longer periods of unemployment than their counterparts who grew up in intact households. These effects, while significant, have been shown to be weaker after controlling for pre-disruption family characteristics. Similar negative effects were also found for the US by Biblarz and Gottainer (2000): their analysis indicated that children raised in single-mother families had significantly lower levels of education, reduced occupational status, and lower levels of reported happiness as adults.

Related to this strand of literature, a number of other studies have looked specifically at the role of parental resources, especially of time. Most of these studies have observed a clear, positive association between the amount of time parents spent with their children, and the children's outcomes later in life (see, for example, the early work by Leibowitz, 1974). Due to a lack of information on the children's choices and their own contributions to their human capital, researchers investigating this issue have mainly relied on various measures of children's outcomes (such as biometrical and health parameters, school attainment, or income later in life) and of parental choices. Carneiro and Heckman (2003) found ample evidence suggesting that parental investments in terms of both time and income are important for the cognitive and non-cognitive outcomes of children. Thus, children raised in single-parent households may be disadvantaged relative to children raised by both parents. Several studies have argued that the detrimental effects of divorce on children are mainly related to reduced investments of time (e.g., Jonsson & Gähler, 1997). Keding and Bianchi (2008) analysed US time-use data in order to determine to what extent marital break-up affects the amount of time parents spend with their children. While the single mothers surveyed were found to have spent a little less time with their children than the married mothers; the differences disappeared after controlling for socioeconomic characteristics. Similarly, using time-use data from Australia, US, Denmark, and France, Craig and Mullan (2012) showed that while lone mothers in the US devoted less total time than partnered mothers to providing "quality care" for their

children, lone mothers in Australia and France devoted more time than partnered mothers, and there was no difference between single and partnered mothers in Denmark.

This stream of literature has been criticised for being too focused on the impact of family decisions, while not taking into account "the choices that children make given the investments in and opportunities available to them" (Haveman and Wolfe, 1995, p. 1836). While information on how children use their time is probably not very indicative for very young children, it becomes increasingly important at later stages, when children start to make decisions independently. A traditional view of time allocation by school-age children splits the time not devoted to "compulsory activities", such as school attendance and personal tasks (care, sleeping, etc.), into the time spent usefully—i.e., doing homework and studying—and any remaining time spent on leisure or activities that are not directly useful.

General models of parental investment in children tend to stress the impact of such investments on the children's human capital, material assets, and social capital; and specifically on the effects of these investments on children's endowments and choices (Leibowitz, 1974, Cunha and Heckman, 2007). Mancini et al. (2011) focused on the tendency of children to imitate their parents' behaviour, such as their reading habits, as a channel of intergenerational transmission. However, there is evidence of important country differences in the relationship between parents' and children's time-use patterns. The influence of the mother has been found to be particularly relevant in Italy and Germany, where it extends to all of the children's activities; whereas the influence of the father has often been shown to be less significant (Cardoso et al., 2010). Interestingly, Italy stands out as the country where the parental role is more pronounced (Gimenez-Nadal et al., 2012, Mullan 2012). From a similar perspective, Del Boca et al. (2012) analysed the impacts of time investments by parents and children on children's cognitive outcomes using the Child Development Supplement of the American PSID (Panel Study of Income Dynamics), and showed that the time investments of the children themselves had a significant effect on the cognitive outcomes of children aged 11-15. The results showed that the mothers' time inputs were important for younger children, but became less relevant as the children grew older.

The effect of the amount of time parents devote to their children on the children's own time allocation choices and outcomes has also been found to depend on the level of education of the parents, which can be seen as a proxy for the "quality" of the investment. Gimenez-Nadal et al. (2012), using time-use data from the UK and Spain, considered three activities: basic childcare, educational childcare (e.g., helping children with homework, talking and reading to them), and supervisory childcare. They found that the parent's educational level

affected the amount of time the parent devoted to different types of childcare. The mother's education was found to have been more relevant in determining the amount of time devoted to childcare, and the overall amount of time spent with children was shown to have increased with the mother's educational level.

As we can see from the discussion above, a key issue in the analysis of the effect of single parenthood on children outcomes is the self-selection of parents into divorce (Kim, 2011). The factors that lead to parental divorce may also lead to other parental behaviours that affect children's outcomes. In other words, it is not necessarily the case that experiencing parental separation or growing up with a single parent is *per se* responsible for the children's outcomes, or that the detrimental effects of family break-up will turn out to be much lower once selection is taken into account. Francesconi at al. (2005), using the German Socio-Economic Panel (GSOEP), analysed children's high school grades and test scores as a function of parental separation. Using several econometric approaches in estimating treatment effects (sibling fixed effects models, Instrumental Variables, and Manski bounds), they found that family structure mattered more than family background when selection was not controlled for. However, after controlling for selection, the effects were considerably smaller. As they were also able to control for the length of time the children were living in single-parent households (following the break-up), they observed that children tended to adjust to the divorce of their parents, and that the short-term and the long-term effects of the break-up were often very different. In a similar vein, Sanz-de-Galdeano and Vuri (2007), using the National Education Longitudinal Study and a Difference-in-Difference approach, found that, in terms of cognitive tests scores, parental separation had very little effect *per se*. Their findings indicated that students who had experienced a parental divorce were already performing worse prior to the divorce event, and that parental divorce was associated with only a very modest (and in some cases, not significant) decrease in test scores. Corak (2001), also adopting a Difference-in-Difference approach, but using Canadian register data; found that the negative effect of a parental loss, after selection was controlled for, became smaller and often was not significant. The effect was different for men and women: men from divorced households earned 3 per cent less than men from intact households, whereas there was no difference among women. In addition, men from divorced families were found to be more likely to rely on income assistance, while this was not the case for women. Consistent with these findings, Bjorklund and Sundstrom (2006), using data on Swedish siblings and considering educational attainment, found little or no effect of divorce. Also using Swedish data, Jonsson and Gahler (1997) investigated early school-leaving patterns and the transition

to upper secondary school. After controlling for socioeconomic status prior to divorce, they found that the children of divorced households had lower levels of educational attainment, but that the effects were not particularly strong. A final contribution to this literature is a study by Pronzato and Aassve (2013), in which they looked at children's behavioural problems after their parents divorced. Using the Millennium Cohort Study, they followed children over time, and found that divorce had a modest effect on children's behaviour. However, the effect was found to be considerably smaller than the effect observed in the more naïve cross-sectional analysis, which did not capture potential selection effects.

3. Method and empirical specification

In order to model the impact of family structure on the child's investment in activities related to human capital accumulation, we consider the following linear specification:

$$y_i = \alpha\, single\_parent_i + \boldsymbol{x}_i'\boldsymbol{\delta} + \varepsilon_i \qquad (1)$$

where y_i denotes the daily time (in minutes) spent by child i reading, studying, or doing homework; $single\_parent_i$ represents an indicator set equal to one if a child lives with a single parent. $\boldsymbol{x}_i$ is a vector of individual and household characteristics which will be explained in the next section, and ε_i represents the zero mean random shock.

As our goal is to properly identify the impact of the family structure on the outcome of interest, we argue that running a simple OLS regression on equation (1) would not be appropriate, as doing so would likely generate biased results. Ultimately, being a single parent can also be the result of unobserved individual choices and preferences. In turn, these unobserved factors can be easily correlated with the outcome of interest. The amount of time devoted by the child to educational activities can be affected by unobserved parental attitudes towards human capital investment, which are themselves correlated to family structures (given the strong correlation between human capital endowment and the likelihood of being a single parent). In this latter scenario, an OLS estimation would provide estimates that are biased upwards, due to the positive correlation between unobserved factors and both the parental structure and the outcome of interest. Nevertheless, the direction of the bias is not clear *a priori*. Therefore, we control for the potential endogeneity of the indicator for the family structure by adopting the *treatment effect* model, as developed in Maddala (1983).

The treatment effects model estimates the effect of an endogenous binary variable (treatment) on a continuous, fully-observed variable, conditional on other independent variables. The main regression function is:

$$y_i = \alpha\, z_i + \boldsymbol{x}_i\boldsymbol{\delta} + \varepsilon_i$$

where z_i is an endogenous indicator set equal to one if the individual receives the treatment. In our case, the treatment corresponds to a child living with one instead of two parents.

The binary treatment z_i is the outcome of an unobserved latent variable, z_i^*, which is assumed to be a linear function of a vector of exogenous covariates, $\boldsymbol{w}_i$ and a random component η_i :

$$z_i^* = \boldsymbol{w}_i\,\boldsymbol{\alpha} + \eta_i$$

whereas the observed decision is:

$$z_i = \begin{cases} 1 & if \quad z_i^* > 0 \\ 0 & otherwise \end{cases}$$

where ε_i and η_i are random components distributed as bivariate normal with mean zero, the covariance is equal to ρ, and the variance is equal to σ. In our empirical application, we consider the maximum likelihood estimator of the above model, and we control for the selection into treatment by including as an exogenous restriction a variable unrelated to the dependent variable in the main regression: parental religious participation.[1]

As we mentioned above, other papers have dealt with the identification problem by using sibling fixed-effects (Francesconi et al., 2010), Difference-in-Difference methods (Sanz-de-Galdeano and Vuri, 2007), or 2SLS estimators (Finlay and Neumark, 2008). The structure and the sample dimension of our data do not allow us to use sibling fixed-effects or a Difference-in-Difference model. The only estimator which could serve as an alternative to the treatment effect model, and which would be suitable for identifying the effects of interest in case of an endogenous binary variable is the standard 2SLS method. Both of these estimators are consistent, but the treatment effect estimator improves upon the latter estimator by offering increased efficiency if the distributional assumptions are met (Greene, 2008; Wooldridge, 2002).

4. Data

In our empirical analysis, we use data from the most recent wave (2008-2009) of the Italian Time Use Survey[2], which is a representative household survey containing a detailed time diary for all of the family members in each household above the age of three, as well as individual and household questionnaires. The survey covers 18,250 households with a total of 44,606 individuals. In each municipality covered by the survey, the households were divided into three groups, and the members of each group were asked to fill in the daily diary on a different day: a weekday, Saturday, or Sunday.[3] For our analysis, we consider diaries completed both during weekdays and weekend days, and in the estimation we control for weekday versus weekend day.

[1] More details on this variable and the criterion justifying this choice are in the next section.
[2] Previous time use surveys were run in 1988 and 2002.
[3] As a result, we have an oversampling of diaries filled out during weekend days.

Each family member was asked to fill out a daily time diary in which each activity had to be recorded over the entire 24 hours. Each activity is described in terms of its type, duration (10-minute episodes or multiples), location, and the people present. The entries in these kinds of time diaries are thought to be more precise and reliable than retrospective information provided on time use. The other advantage of these time-use data is that time use among young children is also recorded. Activities are recorded by the respondent as main and secondary activities. For our analysis, we considered only activities defined by the respondent as being primary.

In addition to the information provided by the diary, the individual and household questionnaires contain other information on each family member, such as employment, education, immigration status; and on household-related characteristics, such as the family's economic status (home ownership, etc.), health status, and satisfaction with various aspects of family life.

5. Variables definitions and sample selection

To evaluate the potential impact of the family structure on the investments children make in their own human capital, we select children between 5 and 18 years old[4]; *i.e.*, children in primary, middle, and secondary education. Our final sample—after excluding all of the observations with missing information on the variables of interest—consists of 5,161 children. The compulsory education ages in Italy are from 6 to 16, but children enter the first grade of primary school in the year in which they turn six, and some children enter even earlier, when they are still five years old.[5] From age 16 onwards, they are free to drop out. Thus, most of the children in our sample were attending school (97 per cent), and were presumably assigned homework.

In our model, we consider the amount of time invested by each child in activities related to human capital accumulation as an independent variable, which we define as the sum of all of the time spent reading, studying, and doing homework during the representative day. We consider only the time intervals for which the respondent reports reading or studying activity as the main activity. We also exclude the time the child spent reading and studying at school. Thus, only homework and other reading or studying activities for leisure are

[4] Excluding five-year-old children not enrolled in school.

[5] The choice of beginning school at age five is limited to children who turn six before the month of April of the scholastic year. The choice of anticipating is left to parents.

considered. Our goal is to concentrate on those activities which children chose to do, or which they did in response to their parents' encouragement.

As we mentioned above, our main objective is to analyse the differences in the amounts of time the children in the single-parent and in the two-parent households spent studying. Our definition of single parent includes parents who are separated and divorced.[6] A small group of reconstructed families (i.e., families with children from previous marriages) are also included in the sample of two-parent households, and represents around 2 per cent of the whole sample (102 observations).

The other controls we include in our specification are the child's characteristics (gender, age, and whether he or she is an only child), the household's characteristics (parental education and religious participation, home ownership, the presence in the home of adults other than the biological or stepparents, internet at home), and area of residence (divided into five macro-regions: North West, North East, Centre, South, Islands). A dummy is also introduced to control for whether the diary was filled in during a weekday or a weekend day. The descriptive statistics of all of these variables are reported in Table 1 for the whole sample, and for the sub-sample of children living with two parents or with a single parent.

Table 1: Descriptive statistics

	All sample		Two-parent HH (1)		Single-parent HH (2)		
Variables	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	t-test (1)-(2)
Time study-read (min)	74.37	78.54	74.72	78.89	71.48	75.67	3,24
Female	0.48	0.50	0.48	0.50	0.51	0.50	-0,02
Age	11.99	3.77	11.92	3.79	12.62	3.61	-0.07***
Only child	0.18	0.38	0.16	0.37	0.36	0.48	-0.20**
Single parent	0.11	0.31	0.00	0.00	1.00	0.00	
Religious participation[§]	3.07	1.13	3.13	1.11	2.58	1.17	+0.55***
Parental education[#]	10.85	3.36	10.80	3.34	11.26	3.52	-0.46***
Home ownership	0.72	0.45	0.75	0.44	0.54	0.50	0.20***
Other adults in HH	0.03	0.17	0.03	0.16	0.05	0.21	-0.02**
Internet in HH	0.68	0.47	0.69	0.46	0.64	0.48	0.04**
North West	0.22	0.41	0.21	0.41	0.28	0.45	-0.07***
North East	0.21	0.41	0.21	0.41	0.23	0.42	-0.02
Center	0.16	0.37	0.15	0.36	0.20	0.40	-0.05***
South	0.29	0.45	0.30	0.46	0.20	0.40	0.10***

[6] We exclude the 120 observations (2 per cent of the sample) representing widows/widowers; however, the results are robust when we keep them in the estimation sample.

Islands	0.12	0.33	0.13	0.33	0.09	0.29	0.04**
Weekday	0.38	0.48	0.38	0.48	0.37	0.48	0.00
	5,161		4,601		560		

Source: Italian Time Use Survey (2008).

Parental education in two-parent households is defined as the average years of education of the two parents. In single-parent families, it coincides with the single parent's years of education.

§ Religious participation in two-parent households is the maximum value between parents of how frequently each attends religious services. The possible categories take values between one and six: never, a few times a year, more than once a month, once a week, every day. In single-parent households, the value of the variable refers to the attendance at religious services of the single parent.

Significance level for a one side t-test: **1%, **5%, *10%

The share of children living in single-parent families has been increasing steadily over time, and doubled over the previous decade as a result of union dissolution. As of 2012, 11.3 per cent of all households consisted of a single parent—usually a mother—with one or more children (ISTAT data for 2012). Concerns have been expressed about whether this shift in family structure has affected the amount of time children are devoting to activities related to human capital accumulation. If we look at the descriptive statistics (Table 1), we can see that the average amount of time the children invest in reading and studying is slightly higher among the children who live with two parents than among the children who live with a single parent: 74.7 versus 71.5 minutes. But this difference is not statistically significant, and even at the extensive margin, no difference emerges by household type (Table 2).

Table 2: Children's reading and studying activities by family type

	Two-parent HH	Single-parent HH
Probability of studying	0.65	0.65
Time studying (unconditional)	74.7	71.5
Time studying (conditional)	114.9	110.0

Source: Italian Time Use Survey (2008).

However, the two family types differ significantly with respect to parents' education and wealth (see Table 1). The single-parent households are poorer: only 5 per cent owns their own home, compared to 7.5 per cent of the two-parent households. The educational levels are also higher in the single-parent households. The children in the single-parent households are slightly older, and are more likely to be an only child. At the same time, they are more likely to live with adults other than their parents.

There are also differences in the regional distribution, as the concentration of single parents is lower in the South and in the Islands than in the other regions.

In addition, as expected, single parents are less likely to report attending religious services. Religious participation[7] is a categorical variable with values ranging from one to six, and is based on how often the parent was attending religious services.

This is the reason why we decide to use parental religious participation as an exclusion restriction in our treatment effect model. In a traditional country such as Italy, where many people go to church regularly, the strong negative correlation between religious faith and non-intact family structures, such as those caused by separation or divorce, is well known and

[7] In the questionnaire, individuals were asked about the frequency of their attendance at worship services, and could choose between the following categories: never, a few times a year, more than once a month, once a week, every day.

documented (i.e., Vignoli and Ferro, 2009). Even though religiosity has been shown to be strongly negatively correlated with single parenthood, we argue that the former should not have affect in a systematic way the amount of time the children spent on educational activities. Indeed, it is reasonable to assume that, if there was a correlation between parental attendance at religious services and the amount of time the children invest in educational activities, this correlation would be random. Thus, parental religious participation should not have affect the dependent variable in any systematic way.

6. Results

Table 3 shows the estimation results obtained with the treatment effects model, our preferred specification; compared with those obtained with the OLS estimation. We start with the full sample, and then break it down according to different family and child characteristics (Tables 5). In Table 3, we can clearly see that living with a single parent reduces the amount of time children spent on reading and studying activities, according to the treatment effect estimation (columns 2 and 3): the children who live with a single parent spend almost half an hour less than their peers living in two-parent families. All of the other regressors have the expected sign: the girls and the older children study more, while the children of more highly educated parents spend more time then their peers on activities related to human capital accumulation. The exclusion restriction has the expected sign, and is strongly significant: the parents who attend religious services frequently have a lower probability of being single. Having no siblings and having more educated parents also increase the likelihood that a child is in a single-parent household, while living in the South or the Islands reduces the likelihood.

The p-value testing the hypothesis of independent equations signals that we cannot rule out endogeneity, because it is rejected at standard significance level; therefore, we can assume that the model is correctly specified, and that it is preferable to the OLS model.

On the other hand, in the OLS estimation the absolute value of the coefficient of single parent is lower, which suggests an upward bias: based on the descriptive statistics, it appears that the children living with a single parent are positively selected, as they have parents with higher levels of education. Having highly educated parents may well be correlated with other unobserved factors that would encourage the children to spend greater amounts of time on activities related to the accumulation of human capital.

Table 3: Models on time spent by children studying/reading. Results for the full sample.

	OLS	TREAT	
		Time studying/reading	Single parent
Single parent	-7.62**	-28.31***	
	(3.37)	(5.64)	
Religious participation			-0.18***
			(0.02)
Female	13.95***	14.17***	0.06
	(2.12)	(2.13)	(0.05)
Age	19.41***	19.84***	0.14**
	(1.97)	(1.98)	(0.05)
Age squared	-0.68***	-0.70***	0.00**
	(0.09)	(0.09)	(0.00)
Only child	-0.04	2.46	0.53
	(2.72)	(2.74)	(0.06)
Parental education	2.37***	2.52***	0.04***
	(0.36)	(0.36)	(0.01)
Home ownership	-1.78	-4.04	-0.53***
	(2.45)	(2.47)	(0.05)
Other adults in the HH	9.88	11.22	0.31**
	(7.60)	(7.63)	(0.12)
Internet at home	0.80	0.22	-0.13**
	(2.43)	(2.43)	(0.06)
North East	-5.79*	-6.04*	-0.08
	(3.23)	(3.23)	(0.07)
Centre	-3.63	-3.78	-0.03
	(3.45)	(3.46)	(0.08)
South	-0.83	-2.05	-0.29***
	(3.01)	(3.00)	(0.07)
Island	-0.77	-1.84	-0.23**
	(3.87)	(3.87)	(0.09)
Weekday	25.20***	25.17***	-0.01
	(2.18)	(2.18)	(0.05)
Λ		11.23	
se (λ)		2.32	
P		0.15	
p-value (ρ=0)		0.00	
Obs	5,161	5,161	

Source: Italian Time Use Survey (2008).

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis

5.1 Heterogeneity

As reported above, there is evidence that two-parent and single-parent families differ according to dimensions that are related to human capital investments of children. We might therefore expect to find that after breaking down the sample by these characteristics, the differences by family type in the amounts of time the children spend reading and studying would increase. In particular, we are interested in finding out whether the negative effect of

living in a single-parent family that emerges from the previous results differs by parental education and wealth. In addition, the negative effect of living with a single parent might differ between the only children and the children with siblings, as well as by each child's age and gender.

Table 4 shows the probability of reading and studying, and the amount of time the children devote to these activities by different household characteristics and family types. Whereas for the full sample (Table 2) we find no differences between the children living with both parents and the children living with a single parent, when we break down our sample according to parental education, wealth, number of siblings, and the child's age and gender, a clear difference emerges. On average, the children living with a highly educated[8] single parent spend even more time studying than the children who live with two highly educated parents (Panel A, Table 4). The opposite pattern is found for the children of less educated parents. This gap applies in terms of both probability and unconditional mean, while for the conditional mean the difference seems to be smaller. When we break our sample down by home ownership, similar results are found: the children living with a single parent read and study less in poorer households, while the opposite is the case for richer families (Panel B, Table 4). Having no siblings does not appear to affect the children in two-parent families, but the only children who living with a single parent report studying and reading much less that the others (Panel C, Table 4). At the same time, the results by gender are in line with recent evidence (Autor and Wasserman, 2013; Bertrand and Pan, 2013), at least for the US: having a single parent is found to have a more detrimental effect on the (cognitive and non-cognitive) outcomes of sons than of daughters (Panel D, Table 4). Given the strong correlation we find between test scores and the amount time devoted to human capital-related activities, our evidence appears to be pointing in the same direction.

We also break down our sample by age (Panel E, Table 4). We consider separately the children of primary school age (5-10); the children of middle school age (11-13); and the children of secondary school age (14-18), who may be expected to spend more time on homework. Here, no differences emerges between the children who are living in a two-parent or a single-parent household in terms of the probability of studying and reading. Meanwhile, in terms of the amount of time devoted to these activities, the differences are small.

[8] Children are classified as having high levels of parental education when the average years of education of the parents (or of the single parent, in the case of single-parent household) are in the top quartile of the sample distribution.

Table 4: Time spent by children studying/reading by family characteristics and single-/two-parent family

	Two-parent HH		Single-parent HH	
Panel A	Parental education		Parental education	
	Low	High	Low	High
Probability of studying	0.64	0.71**	0.62	0.84
Time studying (unconditional)	72.4*	86.8	64.6	101.5
Time studying (conditional)	113.4	122.4	107.4	121.2
Panel B	Home ownership		Home ownership	
	No	Yes	No	Yes
Probability of studying	0.64	0.65	0.62	0.68
Time studying (unconditional)	73.8*	75.0	65.2	76.8
Time studying (conditional)	114.8	115.0	105.6	113.3
Panel C	Only child		Only child	
	No	Yes	No	Yes
Probability of studying	0.65	0.66**	0.68	0.59
Time studying (unconditional)	74.5	76.1**	76.0	63.4
Time studying (conditional)	115.0	114.5	111.0	107.8
Panel D	Gender		Gender	
	Girl	Boy	Girl	Boy
Probability of studying	0.68	0.62	0.70	0.60
Time studying (unconditional)	81.6	68.4	81.2	61.5
Time studying (conditional)	120.3	109.6	116.7	102.0

Panel E	Age category			Age category		
	5-10	11-13	14-18	5-10	11-13	14-18
Probability of studying	0.64	0.72	0.60	0.62	0.73	0.59
Time studying (unconditional)	60.5	87.6	81.0	51.6	83.1	74.0
Time studying (conditional)	94.5	121.0	135.7	83.2	113.8	126.4

Source: Italian Time Use Survey (2008-9). Significance level for a one-side t-test between two-parent and single-mother household: ***1%, **5%, *10%.

Given this descriptive evidence, we decide to apply our model to the sub-samples described above. The results, with only the main variable of interest, are shown in Table 5.[9] The results found for the full sample appear to be driven by the children in the less educated and poorer families. After breaking down the sample according to parental education (Panel A, Table 5), we find that the impact of living with a single parent disappears in highly educated families, whereas it is confirmed—and is even greater than in the full sample—in the less educated families, whose children read and study 31 minutes less than the children from two-parent households.

[9] The full version of Table 5 with all of the regressors reported can be found in Tables A1-A5 in the Appendix.

A similar picture emerges when we compare poorer and richer families (Panel B, Table 5):[10] the children with poorer single parents invest almost 40 minutes less in activities related to human capital accumulation than their peers from poorer two-parents families, while the effect is much smaller (around 19 minutes) and is less significant among richer families.

The only children appear to suffer more from living with a single parent: the amount of time they spend reading and studying is reduced by more than 44 minutes per day, whereas for children with siblings, the reduction is much lower (19 minutes) (Panel C, Table 5). We could therefore argue that having siblings might serve as an incentive rather than as an obstacle for children to invest their time in educational activities. Especially interesting is our finding that only the male children suffer from living with a single parent: they study and read 32 minutes less than the male children who live with two parents. However, the family structure is not found to have an effect on the girls (Panel D, Table 5). The results by gender confirm the recent evidence from Autor and Wasserman (2013) and Bertrand and Pan (2013), in which male children living in single-parent households were found to have had worse cognitive and non-cognitive outcomes. Bertrand and Pan (2013) found that, on average, boys—but not girls—were affected when the extent and the quality of parental inputs were reduced.

Since our age bracket is quite broad, we try to disentangle the potential confounding effects due to heterogeneity in age by dividing the sample into three groups, as can be seen in Table 4. The negative effect of living with a single parent is found to increase with age, as the children of secondary school age suffer the most: they spend 39 minutes less per day reading and studying relative to their peers who are living with two parents (Panel E, Table 5). Despite being smaller in magnitude, these results are all confirmed when we consider the OLS estimation.

[10] Unfortunately, the survey does not provide information on household wealth, Therefore, we used home ownership as a proxy. However, the results are also robust to using the information on having a second house as a proxy.

Table 5: Time spent by children studying/reading. Heterogeneity of results.

	OLS			TREAT		
Panel A	Low education		High education	Low education		High education
Single parent	-7.44**		1.70	-30.53***		-10.41
	(3.57)		(9.42)	(6.47)		(1327)
Panel B	No owner		Owner	No owner		Owner
Single parent	-11.66**		-3.95	-38.90***		-18.78**
	(5.05)		(4.55)	(8.99)		(8.08)
Panel C	Only child		With siblings	Only child		With siblings
Single parent	-17.07***		-3.36	-44.36***		-19.35***
	(6.00)		(4.09)	(13.47)		(6.59)
Panel D	Girl		Boy	Girl		Boy
Single parent	-6.37		-9.26**	-18.01		-32.08***
	(4.80)		(4.71)	(14.18)		(6.59)
Panel E	5-10 age	11-13 age	14-18 age	5-10 age	11-13 age	14-18 age
Single parent	-7.86	-12.28*	-6.25	-28.64***	-35.84***	-38.74***
	(4.90)	(6.29)	(5.75)	(8.64)	(12.89)	(9.35)

5.2 Robustness checks

In this section, we provide additional evidence which allow us to check the robustness of our results.

First, we try to disentangle which factors drive our results. Previous research has uncovered a strong correlation between the time-use of parents and their children (Cardoso et al., 2010).[11] An investment by a child in studying/reading represents an input into the child's skill production function. Meanwhile, the role of the investment of time by parents in the skill formation of their children has been well documented in the literature (Cuhna and Heckman, 2007). If the negative effect of having a single parent on the investments by children in educational activities is attributable to a reduction in the amount of time spent by the parents—and, in particular, in the amount of time devoted to activities related to human capital accumulation, we expect to find smaller (if any) effects after we control for the amount of time the parents spend with their children. We then replicate the analysis by controlling for parental working time, which is inversely correlated to the amount of time invested in studying/reading with children. Ideally, we would control for the amount of parental time devoted to studying/reading with the child, because this is the activity which would affect the child's investment in studying/reading the most. On the other hand, the former would be strongly correlated to both the endogenous variable and the dependent variable. In addition, in families in which more than one child is present, it is not possible to determine, based on our

[11] This paper analysed the relationship between parents' and children' time use based on a cross-section of three countries (France, Germany, and Italy).

dataset, which of the children the parent is spending her/his time with. Moreover, parental working time can also be seen as a function of factors exogenous to parental preferences, as it is the result of market equilibrium.

The evidence for Italy shows that the mother's time use affects the time use of the children in the family, especially in terms studying/reading activities; whereas the father's time use have a weak negative effect or no effect (Cardoso et al., 2010). Thus, in this series of robustness checks we concentrate on the single mothers, excluding the single fathers from the sample.[12] In Table 6 we show the baseline results for comparison (Column 1); the results excluding the single fathers (Column 2); the results excluding the single fathers and controlling for parental working time[13] (Column 3); and the results considering as a dependent variable only the amount of time invested by the child in studying/reading alone, and controlling for parental working time (Column 4). Column (2) shows that the results are driven by single mothers. When we control for the amount of time worked by parents, the coefficient of the variable *single parent* is slightly smaller than in the baseline estimate, and the effect of working time is, as expected, negative (Column 3).

Finally, we consider a more restrictive specification in order to isolate the effect on children of their own investments, and we consider as a dependent variable only the amount of time each child devotes to studying and reading when he/she is alone (Column 4). The negative effect of having a single mother is strongly reduced. These results, taken together, seem to confirm that for the children in the sample, the negative effect on time investment in skill formation due to having a single parent is driven by the lower investments of their parents in human capital-enhancing activities.

Table 6: Robustness checks of treatment effect model on time spent by children studying/reading

	(1)	(2)	(3)	(4)
	Baseline	Only single mothers	Only single mothers and parents' work time	Only study-read time alone
Single parent	-28.31***	-27.96***	-24.81***	-9.82**
	(5.64)	(5.93)	(7.61)	(5.01)
Hours worked			-0.07	-0.06*
			(0.05)	(0.04)
Obs.	5,161	5,118	5,118	5,118

Note: Each entry represents an estimate from the treatment regression model (only main equation).

[12] Single father represent 2 per cent of the sample.

[13] Parental working time is defined as the total number of minutes spent working by the single parent, or it is the sum of the number of minutes spent at work by the father and by the mother in two-parent households.

6. Conclusions

In this paper, our goal is to provide some evidence to help us better understand the effects on Italian children of living with a single parent, especially in terms of their own investments in activities related to human capital accumulation. As we have argued, this issue is of critical importance, not least because the numbers of single-parent households are increasingly so rapidly. Our study is also relevant for other southern European countries in which divorce rates have risen in recent years, and which have welfare systems similar to Italy's: i.e., systems that provide weak support for families, and for single parents in particular. The other key feature of Italy is its school system, which relies heavily on parental involvement and investments of time. In this setting, the children of single parents are particularly vulnerable (Checchi, 1997 and 2010).

Our results lend some support to this idea. Previous studies have documented that the effect of family structure is considerably weakened, or even disappears, once endogeneity and selection are accounted for. The latter was especially the case for cognitive outcomes, which suggests that after family conditions are properly controlled for, growing up in a single-parent family may not have any detrimental impact. Following up on this line of analysis, we control for selection effects by using a treatment effect model. In contrast to most of the recent studies on this issue, our analysis for Italy find a negative effect even after selection is controlled for. This result is consistent with the idea that Italian children spend less time at school than most other children in OECD countries. Thus, children who live with a single parent are particularly disadvantaged, since single parents are less likely to spend time with them. The groups of children who suffer the most from living with a single parent in Italy seem to be those from families with less education and lower incomes, as well as only children and boys.

The negative effect we find seems to be driven by the reduction in the amount of parental input children in single-parent families receive relative to their peers in two-parent families. In addition, the gender gap in the negative effect suggests that our results might be driven by lower parental investments. Indeed, these results are in line with the evidence that having less parental input has a more detrimental effect on the outcomes of boys than of girls (Bertrand and Pan, 2013).

There are, however, caveats to our study. First, whereas time-use data are superior to other types of data in one important respect (namely, they provide very precise measures of the amount of time children and parents actually spend on specific activities), they have some shortcomings which may affect our analysis of the relationship between family status and

children's time use. For instance, we do not know the point in time when the parents separated, and it is certainly possible that the negative effects on the children's outcomes depend on the age at which the children experience the family disruption (e.g., Sigle-Rushton et al., 2014). Moreover, we do not know how long each single parent has been single. It is also possible that the absent parent is spending periods of time with the children that are not recorded by the time-use data; if this is the case, these intervals would not be captured by the survey. The time-use data are also cross-sectional, which rules out other techniques used to control for selection—the obvious one being fixed-effect estimation. Second, although we try to control for selection with our treatment effect strategy, this approach relies on the validity of strong distributional assumptions and of our chosen exclusion restriction.

Despite the limitations of the data available for the analysis, we believe that our findings have important policy implications, showing the need for schools and the welfare system to provide more support to single parents. One possible strategy would be to subsidise after-school activities for children from poor families, especially those with only one parent at home. This policy perspective seems particularly pressing for Italy, where the prevalence of divorce and separation is rising sharply, and where there are clear indications that the phenomenon is spreading to families of lower socioeconomic status, who may lack the economic resources needed to compensate for the loss of parental time investment.

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Appendix

Table A1: Time spent by children studying/reading. Heterogeneity of results by parental education.

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Low edu	High edu	Low education		High education	
Single parent	-7.44**	1.70	-30.53***		-10.41	
	(3.57)	(9.42)	(6.47)		(1327)	
Religious participation				-0.17***		-0.24***
				(0.03)		(0.06)
Female	13.76**	14.81**	13.89***	0.03	15.22***	0.23*
	(2.26)	(5.85)	(2.27)	(0.05)	(5.84)	(0.13)
Age	17.91***	23.67***	18.33***	0.12**	24.00***	0.22*
	(2.12)	(5.04)	(2.14)	(0.05)	(5.00)	(0.13)
Age squared	-0.66**	-0.70***	-0.67***	-0.00*	-0.71***	0.01
	(0.09)	(0.22)	(0.09)	(0.00)	(0.22)	(0.01)
Only child	0.50	-0.12	3.49	0.57***	0.80	0.37**
	(2.91)	(7.66)	(2.97)	(0.06)	(7.57)	(0.15)
Home ownership	-0.64	-1.39	3.20	-0.53***	-1.81	-0.18
	(2.52)	(8.65)	(2.55)	(0.06)	(8.61)	(0.17)
Other adults in the HH	9.56	18.39	10.84	0.25*	19.41	0.64
	(7.76)	(35.18)	(7.81)	(0.13)	(34.06)	(0.65)
Internet at home	6.16**	-14.46	5.86**	-0.05	-14.61	-0.08
	(2.40)	(9.76)	(2.41)	(0.06)	(9.69)	(0.19)
North East	-4.23	-12.25	-4.27	-0.01	-13.04	-0.41**
	(3.46)	(8.59)	(3.46)	(0.08)	(8.49)	(0.18)
Centre	-2.33	-11.82	-2.22	0.03	-12.54	-0.30
	(3.68)	(9.20)	(0.19)	(0.08)	(9.12)	(0.19)
South	1.95	-17.51**	0.51	-0.31***	-18.06**	-0.18
	(3.21)	(8.19)	(3.21)	(0.08)	(8.10)	(0.17)
Island	3.08	-22.35**	2.03	-0.19*	-23.60**	-0.64**
	(4.12)	(11.26)	(4.13)	(0.10)	(11.04)	(0.30)
Weekday	26.51***	18.61***	26.53***	0.01	18.41***	-0.13
	(2.35)	(5.73)	(2.35)	(0.06)	(5.79)	(0.13)
λ			12.51		6.59	
se (λ)			2.61		5.34	
P			0.17		0.08	
p-value (ρ=0)			0.00		0.22	
Obs	4,352	809	4,352		808	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A2: Time spent by children studying/reading. Heterogeneity of results by home ownership.

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	No owner	Owner	No owner		Owner	
Single parent	-11.66**	-3.95	-38.90***		-18.78**	
	(5.05)	(4.55)	(8.99)		(8.08)	
Religious participation				-0.23***		-0.15***
				(0.04)		(0.03)
Female	14.80***	13.62***	15.47***	0.08	13.68***	0.03
	(3.93)	(2.51)	(3.94)	(0.08)	(2.51)	(0.06)
Age	24.34***	17.91***	24.66***	0.08	18.24***	0.18***
	(3.63)	(2.35)	(3.65)	(0.08)	(2.35)	(0.06)
Age square	-0.95***	-0.60***	-0.96***	-0.00	-0.61***	-0.01**
	(0.16)	(0.10)	(0.16)	(0.00)	(0.10)	(0.00)
Only child	4.55	-2.18	10.27*	0.67***	-0.86	0.47***
	(4.99)	(3.23)	-38.90***		(3.22)	(0.07)
Parental education	1.79***	2.60***	1.95***	0.03**	2.72***	0.05***
	(0.67)	(0.43)	(0.67)	(0.01)	(0.42)	(0.01)
Other adults in the HH	13.47	7.47	15.96	0.24	8.32	0.35**
	(10.87)	(9.76)	(10.85)	(0.20)	(9.79)	(0.16)
Internet at HH	0.20	1.49	-0.64	-0.12	1.11	-0.15*
	(4.17)	(2.98)	(4.16)	(0.09)	(2.98)	(0.08)
North East	-10.68	-3.83	-9.86	0.04	-4.19	-0.15
	(6.55)	(3.72)	(6.59)	(0.12)	(3.71)	(0.09)
Center	-1.87	-4.13	-1.91	-0.02	-4.26	-0.03
	(6.22)	(4.12)	(6.29)	(0.13)	(4.11)	(0.09)
South	-1.44	0.08	-3.53	-0.23**	-0.68	-0.33***
	(5.38)	(3.62)	(5.42)	(0.11)	(3.60)	(0.09)
Islands	6.85	-3.84	4.20	-0.35**	-4.35	-0.16
	(7.14)	(4.61)	(7.13)	(0.16)	(4.60)	(0.11)
Weekday	21.23***	26.81***	21.20***	0.01	26.82***	-0.01
	(3.98)	(2.59)	(4.01)	(0.08)	(2.59)	(0.06)
λ			15.84		7.63	
se (λ)			4.28		3.09	
P			0.21		0.10	
p-value (ρ=0)			0.00		0.01	
Obs	3,739	1,422	1,422		3,739	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A3: Time spent by children studying/reading. Heterogeneity of results by gender.

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Girl	Boy	Girl		Boy	
Single parent	-6.37	-9.26**	-18.01		-32.08***	
	(4.80)	(4.71)	(14.18)		(6.59)	
Religious participation				-0.14***		-0.22***
				(0.03)		(0.03)
Age	21.19***	17.69***	21.49***	0.18**	18.03***	0.10
	(2.89)	(2.69)	(2.88)	(0.07)	(2.71)	(0.07)
Age square	-0.72***	-0.65***	-0.73***	-0.01**	-0.65***	-0.00
	(0.12)	(0.12)	(0.12)	(0.00)	(0.12)	(0.00)
Only child	-0.88	0.44	0.67	0.57***	2.94	0.50***
	(4.03)	(3.71)	(4.31)	(0.08)	(3.71)	(0.08)
Parental education	2.44***	2.32***	2.56***	0.06***	2.43***	0.03**
	(0.54)	(0.48)	(0.54)	(0.01)	(0.48)	(0.01)
Home ownership	-2.05	-1.39	-3.53	-0.61***	-3.49	-0.46***
	(3.67)	(3.28)	(3.92)	(0.08)	(3.28)	(0.08)
Other adults in the HH	3.11	16.66*	3.85	0.30*	18.08*	0.30
	(11.66)	(9.79)	(11.71)	(0.17)	(9.92)	(0.18)
Internet at HH	2.00	-0.27	1.70	-0.12	-0.99	-0.15*
	(3.70)	(3.18)	(3.71)	(0.08)	(3.19)	(0.08)
North East	-9.64**	-2.27	-9.94**	-0.14	-2.25	-0.01
	(4.72)	(4.44)	(4.71)	(0.10)	(4.44)	(0.10)
Center	-6.97	-0.48	-7.17	-0.07	-0.46	0.03
	(5.07)	(4.71)	(5.07)	(0.11)	(4.73)	(0.11)
South	-1.36	-0.94	-2.25	-0.39***	-1.96	-0.21**
	(4.55)	(4.01)	(4.58)	(0.10)	(4.01)	(0.10)
Islands	0.71	-1.91	0.13	-0.19	-3.10	-0.25*
	(6.06)	(5.00)	(6.08)	(0.14)	(4.99)	(0.13)
Weekday	25.86***	24.66***	25.97***	0.07	24.43***	-0.07
	(3.28)	(2.91)	(3.27)	(0.07)	(2.92)	(0.07)
λ			6.35		12.37	
se (λ)			6.81		2.61	
P			0.08		0.17	
p-value (ρ=0)			0.35		0.00	
Obs	2,483	2,678	2,483		2,678	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A4: Time spent by children studying/reading. Heterogeneity of results by only/not only child.

	OLS		TREAT			
			Time study-read	Single parent	Time study-read	Single parent
	Only child	With siblings	Only child		With siblings	
Single parent	-17.07***	-3.36	-44.36***		-19.35***	
	(6.00)	(4.09)	(13.47)		(6.59)	
Religious participation				-0.21***		-0.18***
				(0.05)		(0.03)
Female	12.97***	14.12***	13.41***	0.06	14.22***	0.05
	(4.94)	(2.36)	(4.97)	(0.10)	(2.36)	(0.06)
Age	26.33***	17.78***	27.37***	0.18**	18.06***	0.13**
	(4.38)	(2.21)	(4.43)	(0.09)	(2.21)	(0.06)
Age square	-0.99***	-0.61***	-1.02***	-0.01	-0.62***	-0.00*
	(0.19)	(0.10)	(0.19)	(0.00)	(0.10)	(0.00)
Parental education	2.86***	2.28***	3.28***	0.06***	2.37***	0.04***
	(0.83)	(0.40)	(0.81)	(0.02)	(0.40)	(0.01)
Home ownership	-8.52	-0.31	-14.08**	-0.62***	-1.71	-0.50***
	(5.51)	(2.72)	(6.03)	(0.11)	(2.72)	(0.06)
Other adults in the HH	-5.42	13.31	2.56	0.86***	13.56	0.11
	(13.67)	(8.66)	(14.49)	(0.26)	(8.65)	(0.16)
Internet at HH	0.89	0.46	-1.91	-0.40***	0.31	-0.03
	(5.30)	(2.73)	(5.37)	(0.11)	(2.73)	(0.07)
North East	-11.23*	-4.24	-10.07	0.15	-4.69	-0.17**
	(6.76)	(3.69)	(6.81)	(0.14)	(3.69)	(0.08)
Center	1.53	-5.33	2.56	0.17	-5.65	-0.09
	(7.15)	(3.96)	(7.14)	(0.14)	(3.97)	(0.09)
South	0.05	-0.87	-0.66	0.01	-1.97	-0.38***
	(7.01)	(3.36)	(7.07)	(0.15)	(3.35)	(0.08)
Islands	3.11	-1.39	2.67	0.05	-2.33	-0.30***
	(9.37)	(4.29)	(9.40)	(0.20)	(4.28)	(0.11)
Weekday	22.27***	25.67***	21.35***	-0.15	25.77***	0.04
	(4.99)	(2.42)	(5.01)	(0.10)	(2.42)	(0.06)
λ			16.13		8.32	
se (λ)			6.63		2.59	
P			0.22		0.11	
p-value (ρ=0)			0.02		0.00	
Obs	929	4,232	929		4,232	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.

Table A5: Time spent by children studying/reading. Heterogeneity of results by child age.

	OLS			TREAT					
				Time study-read	Single parent	Time study-read	Single parent	Time study-read	Single parent
	5-10 age	11-13 age	14-18 age	5-10 age		11-13 age		14-18 age	
Single parent	-7.86	-12.28*	-6.25	-28.64***		-35.84***		-38.74***	
	(4.90)	(6.29)	(5.75)	(8.64)		(12.89)		(9.35)	
Religious participation					-0.17***		-0.16***		-0.19***
					(0.04)		(0.05)		(0.04)
Female	5.92**	15.29**	21.25**	6.01**	0.02	15.59***	0.08	21.75***	0.08
	(2.80)	(4.39)	(3.90)	(2.81)	(0.09)	(4.39)	(0.10)	(3.92)	(0.08)
Only child	2.68	11.70**	-9.02*	4.96	0.56***	14.22**	0.45***	-4.52	0.56***
	(3.68)	(5.81)	(4.98)	(3.73)	(0.09)	(6.02)	(0.12)	(4.99)	(0.09)
Parental education	-0.05	1.67**	4.90**	0.03	0.03*	1.86***	0.04**	5.25***	0.05***
	(0.46)	(0.73)	(0.67)	(0.46)	(0.01)	(0.72)	(0.02)	(0.67)	(0.01)
Home ownership	-3.85	-6.14	4.37	-5.56*	-0.47***	-8.79	-0.51***	0.04	-0.59***
	(3.29)	(5.57)	(4.43)	(3.30)	(0.09)	(5.59)	(0.11)	(4.48)	(0.08)
Other adults in the HH	17.55**	13.69	6.74	18.83**	0.34	17.92	0.68***	7.63	0.15
	(8.09)	(14.23)	(14.24)	(8.15)	(0.22)	(14.31)	(0.24)	(14.24)	(0.19)
Internet at HH	3.13	0.72	1.15	2.76	-0.10	-0.38	-0.21*	0.17	-0.12
	(3.09)	(5.61)	(4.62)	(3.10)	(0.10)	(5.56)	(0.12)	(4.64)	(0.09)
North East	0.63	-10.43	-10.86	0.37	-0.11	-11.06*	-0.08	-10.98*	-0.06
	(4.07)	(6.37)	(6.63)	(4.07)	(0.12)	(6.40)	(0.14)	(6.66)	(0.11)
Center	-3.64	-5.96	-5.79	-3.20	0.11	-6.98	-0.14	-6.51	-0.10
	(4.28)	(7.24)	(6.71)	(4.33)	(0.13)	(7.28)	(0.16)	(6.74)	(0.12)
South	6.16	-7.13	-6.16	5.79	-0.08	-9.47	-0.52***	-8.76	-0.35***
	(4.00)	(5.96)	(5.78)	(4.00)	(0.12)	(5.92)	(0.15)	(5.78)	(0.11)
Islands	2.46	0.42	-4.72	1.88	-0.15	-0.89	-0.22	-7.15	-0.31**
	(5.15)	(8.47)	(7.03)	(5.15)	(0.17)	(8.48)	(0.19)	(7.03)	(0.14)
Weekday	15.74***	31.72***	31.17***	15.84***	0.03	31.09***	-0.12	31.39***	0.03
	(2.87)	(4.53)	(3.99)	(2.88)	(0.09)	(4.55)	(0.11)	(4.01)	(0.08)
λ				10.79		12.87		18.09	
se (λ)				3.15		5.88		4.04	
P				0.17		0.18		0.21	
p-value (ρ=0)				0.00		0.03		0.00	
Obs	1,974	1,144	2,043	1,974		1,144		2043	

Significance level: ***1%, 5%**, 10%*. Robust standard errors in parenthesis.